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April 30, 1982

Mr. Richard D. Stonebraker, Deputy Chief
Hazardous Emergency Response Branch
Air and Hazardous Materials Division
Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, GA 30365

Subject: LOCATION OF GROUND-WATER FLOW-PATHS AT THE SAAD SITE,
NASHVILLE, TENNESSEE
TDD# F4-8204-04

Dear Mr. Stonebraker:

Region IV FIT personnel assisted by Tennessee Water Quality Control personnel conducted earth resistivity surveys at the Saad Site - Croft Spring area, Nashville, Tennessee, during the week of April 19-23, 1982. Resistivity profiles were conducted at 160 locations at two different depths below ground surface. These depths (25 and 50 feet) were identified by resistivity soundings as secondary porosity zones within the Bigby-Cannon Limestone. The Saad and Louisville and Nashville (L & N) Sinkholes are within the Bigby-Cannon Limestone. The Croft Spring discharges near the contact of the Bigby-Cannon Limestone (aquifer) and the underlying Hermitage Formation (confining bed).

Figure 1 shows the interpretation of apparent resistivity data. Two important interpretations were possible. First, the major ground-water flow-paths were identified. These flow-paths are most distinguishable at the 50-foot zone. The flow-paths at the 25-foot zone were not as distinct due to the fact that a majority of the Croft farm along Trousdale Blvd. is a recharge zone. A very distinct path at the 50-foot zone was identified down gradient of the Saad Sinkhole. This path is apparently the major link between the Saad Sinkhole and the Croft Spring. At least four distinct flow-paths were identified between the L & N Sinkhole and the Croft Spring. Due to the extent of the L & N Sinkhole (approximately 1400 feet long and 150 feet wide) other flow-paths may be developing. The second important interpretation is based on the identification of anomalies of low resistivity. These anomalies are interpreted as possible ground-water contamination. The 25-foot zone anomaly is approximately 300 feet down gradient of the Saad Sinkhole and approximately 1000 feet down gradient of the L & N Sinkhole. The

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50-foot zone anomaly is approximately 100 feet down gradient of the Saad Sinkhole and approximately 500 feet down gradient of the L & N Sinkhole. The 25-foot zone anomaly is more extensive possibly due to hydrocarbon contamination floating above the natural groundwater. The anomalies in the open field south of the sinkholes may be accumulated contamination within solution cavities. The anomaly just west of the Croft home may be due to farm chemicals spilled while mixing.

The recommended locations for five monitoring wells are indicated in Figure 1. All of these wells should be drilled to a depth of 50 feet. Samples obtained from these wells would serve to confirm the interpretations reached in this study.

Respectfully,

H. Dan Harman, Jr.

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Project Hydrogeologist

Gary P. Clemons

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